NON-PUBLIC?: N
ACCESSION #: 8901030019
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Indian Point Unit No. 2 PAGE: 1 OF 5

DOCKET NUMBER: 05000247

TITLE: Reactor Trip Due to Main Generator Trip
EVENT DATE: 11/22/88 LER #: 88-018-00 REPORT DATE: 12/21/88

OPERATING MODE: n POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
N
ME: Jude G. Del Percio, Manager Regulatory Affairs TELEPHONE: 914 526-5127

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: TL COMPONENT: IEL MANUFACTURER: W120
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On November 22, 1988 at approximately 1208 hours, a unit trip from full power occurred. The main generator 86P lockout relay was identified as the initiating signal by the first out indication on the computer-generated sequence of events report. A target relay in the Control Room identified the trip signal as being initiated from the Regulator Cabinet on the 33 foot elevation in the Turbine Building. Subsequent troubleshooting and signal verification of the circuit identified the generator volts/hertz trip system as the probable source of the trip signal. There was no impact on public health and safety.

END OF ABSTRACT

TEXT PAGE 2 OF 5

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse Four Loop Pressurized Water Reactor
Main Generator Excitation System

IDENTIFICATION OF OCCURRENCE:

Reactor trip due to Main Generator Trip initiated by the generator volts/hertz trip system.

REPORTABILITY DETERMINATION DATE:

November 22, 1988

REPORT DUE DATE:

December 22, 1988

REFERENCES:

SOR 88-611, dated November 22, 1988

PAST SIMILAR OCCURRENCE:

None

DESCRIPTION OF OCCURRENCE:

On November 22, 1988, at approximately 1208 hours, a unit trip from full power occurred. The main generator 86P lockout relay was identified as the initiating signal by the first out indication on the computer-generated sequence of events report. A target relay in the Control Room identified the trip signal as being initiated from the Regulator Cabinet on the 33 foot elevation in the Turbine Building.

This LER is required since the reactor trip constitutes an unplanned actuation of the Reactor Protection System. All safety systems functioned as required. Other than the analysis provided below, which was initiated to determine the cause of the trip, no further analysis of the occurrence is necessary. There was no effect upon the health and safety of the public.

CAUSE OF INITIATING EVENT:

Spurious trip signal generated in the generator volts/hertz trip system most likely caused the trip.

ANALYSIS OF OCCURRENCE:

The sequence of events report was reviewed after completion of the unit trip. The first out indication on the computer-generated sequence of events report identified the main generator 86P lockout relay as the initiating signal. A target relay in the Control Room indicated that the trip signal originated from the Regulator Cabinet. No trip lockout signals or circuit problems were identified in the Regulator Cabinet. The Regulator Cabinet trip circuitry was checked to verify the trip target relay operation.

The Regulator Cabinet trip output signals are initiated by any of the following signals:

a) Low voltage from both separate -15V power supplies in the cabinet

b) Low voltage from both separate +15V power supplies in the cabinet

c) Low voltage from both separate +24V power supplies in the cabinet

d) A generator volts/hertz trip signal.

By design, the generator volts/hertz trip system is interlocked to disable the trip signal whenever the Main Generator is connected to the grid. Therefore, since the generator breaker was closed, the generator volts/hertz trip system, which is located prior to the interlock, was not considered to be a likely source of the trip signal. The power supplies were therefore checked for faults and verified to be operable.

Subsequent investigation revealed that circuits at the Buchanan substation were not connected. These circuits were designed to be part of the circuit which enabled relay 52GX (Westinghouse Model SG located in Control Room panel FAR) to be energized upon connecting the Main Generator to the grid. Since these circuits were not connected, relay 52GX was prevented from being energized. This allowed the normally closed (de-energized relay condition) contact to remain closed. This contact is in the circuit between the trip output of the generator volts/hertz trip system and the input to the Main Generator trip logic. This contact is intended to be open when the generator breaker is closed, thereby preventing a trip due to a spurious volts/hertz output signal while the Main Generator is connected to the grid and true volts/hertz trip signals would not be expected.

ANALYSIS OF OCCURRENCE: (continued)

Susceptibility to false trips during power operation from the generator volts/hertz trip system was considered by Con Edison engineering during the design review of the new General Electric Main Generator. Because of this, the

relay 52GX interlock was added during installation. This interlock was not part of the original General Electric circuit design.

Since this interlock was discovered to be inoperable, and the power supplies were verified to be operational and within specification, the generator volts/hertz system card and Plain Generator trip logic cards were targeted for additional troubleshooting. All connections were inspected for tightness, voltages were checked, and output signals verified. While no obvious problems was identified during the troubleshooting of these circuits, the generator volts/hertz system card was determined to be the probable source of the trip signal because it is most susceptible to transients and external electromagnetic interference (EMI). Finally, close inspection of the original interlock design showed a possible weakness to EMI. In the original design the wire from the 52GX interlock to the Main Generator trip logic input could act like an antenna and thus be susceptible to EMI.

Due to the nature of this spurious actuation it is not possible to determine with certainty what part of the Regulator Cabinet circuitry actually initiated the trip. The above analysis only indicates what were the most likely initiators and/or contributors to the spurious trip.

CORRECTIVE ACTION:

A temporary bypass switch was added in the Control Room to manually energize relay 52GX when the Main Generator is connected to the grid.

In addition, to prevent the wire from the 52GX interlock to the Main Generator trip logic input from being susceptible to EMI, the wire is set to -24 volts when the 52GX relay is energized. Therefore, upon connecting the Main Generator to the grid, the following will now occur:

a) Relay 52GX will be energized (either manually or automatically).
b) The generator volts/hertz trip system output will be isolated from the Main Generator trip logic input.
c) The Main Generator trip logic input will be set to -24 volts, to prevent EMI from causing a false trip.

CORRECTIVE ACTION: (continued)

The temporary bypass switch modification and the -24 volt modification were completed prior to the unit going critical. The remainder of the 52GX interlock modification will be completed during the 1989 refueling outage.

Based on the above analysis, Con Edison believes that the above corrective

actions will preclude the possibility of spurious trips from originating from the Regulator Cabinet.

ATTACHMENT 1 TO 8901030019 PAGE 1 OF 1

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December 21, 1988

Re: Indian Point Unit No. 2
Docket No. 50-247
LER 88-018-00

Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

The attached Licensee Event Report LER 88-018-00 is hereby submitted in accordance with the requirements of 10CFR50.73.

Very truly yours,

Attachment

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END OF DOCUMENT

ACCESSION #: 8901030032